Amendment to the Claims

Please amend claims 24, 27 and 30-31 as follows:

1 (Original): A plasma immersion ion implant apparatus comprising:

a plasma chamber configured to receive a process gas;

a radio frequency (RF) source configured to resonate radio frequency currents in a radio frequency antenna;

a radio frequency antenna including an active antenna surrounding the plasma chamber and coupled to the RF source and a parasitic antenna surrounding the plasma chamber and not directly coupled to any RF source; and

a platen for holding a target,

wherein electro-magnetic fields induced by the radio frequency currents are effective to pass into the plasma chamber and excite and ionize the process gas to generate plasma within the plasma chamber.

2 (Original): The apparatus of claim 1, wherein the active antenna includes a horizontally-extending coil and the parasitic antenna includes a vertically-extending coil.

3 (Original): The apparatus of claim 1, wherein the active antenna includes a vertically-extending coil and the parasitic antenna includes a horizontally-extending coil.

4 (Original): The apparatus of claim 1, wherein the parasitic antenna includes a plurality of turns with one end grounded.

5 (Original): The apparatus of claim 4, further comprising means for adjusting a number of turns of the parasitic antenna providing a parasitic effect.

6 (Withdrawn): The apparatus of claim 1, wherein the parasitic antenna includes a plurality of turns with both ends floating.

7 (Original): The apparatus of claim 1, wherein an inner diameter of each antenna is greater than a size of the target.

8 (Original): The apparatus of claim 1, wherein the parasitic antenna is above and coaxial with the active antenna.

9 (Original): The apparatus of claim 1, wherein at least one antenna is liquid cooled.

10 (Original): The apparatus of claim 9, wherein the parasitic antenna is coupled to the plasma chamber via a thermally conductive elastomer.

11 (Original): The apparatus of claim 1, wherein the plasma chamber includes:
a horizontal planar section positioned above the platen;
a vertical cylindrical section extending from the horizontal planar section; and
a top section coupled to the vertical cylindrical section.

12 (Original): The apparatus of claim 11, wherein the horizontal planar section and vertical cylindrical section are dielectric, and the top section is conductive and grounded.

13 (Original): The apparatus of claim 12, wherein the horizontal planar section and vertical cylindrical section are formed of a high purity ceramic material.

14 (Original): The apparatus of claim 13, wherein the high purity ceramic material is >99.6% Al_2O_3, AlN, Yittria or YAG.

15 (Original): The apparatus of claim 12, wherein the top section is formed of Al.

16 (Original): The apparatus of claim 11, wherein the top section is liquid cooled.

17 (Original): The apparatus of claim 1, further comprising a plasma igniter for introducing a strike gas into the plasma chamber to assist in igniting a plasma.

18 (Original): The apparatus of claim 1, further comprising a gas source controller for maintaining a pressure of the plasma chamber at a predetermined value.

19 (Original): The apparatus of claim 1, wherein the RF source operates at a low RF frequency.

20 (Original): The apparatus of claim 19, wherein the low RF frequency is less than 27 MHz.

21 (Original): The apparatus of claim 19, wherein the low RF frequency is 400 KHz, 2 MHz, 4 MHz or 13.56 Mhz.

22 (Withdrawn): A method of plasma immersion ion implantation, the method comprising the steps of:

generating an ionic plasma by exposing a process gas to a radio frequency (RF) source via a first active coil;

tuning the ionic plasma by parasitically damping via a second parasitic coil that is not connected to any RF source; and

implanting a target using the ionic plasma by providing a negative voltage to the target.

23 (Withdrawn): The method of claim 22, wherein the generating step further includes introducing a strike gas to the RF source.

24 (Amended): A plasma chamber comprising:

a horizontal planar dielectric section for positioning above a platen;

a vertical cylindrical dielectric section extending from the horizontal planar section; ~~and~~

a liquid cooled top conductive section coupled to the vertical dielectric section; and

a radio frequency antenna including a horizontally-extending coil positioned proximate to the horizontal planar dielectric section and a vertically-extending coil positioned proximate to the vertical cylindrical dielectric section, the radio frequency antenna inducing radio frequency currents into the plasma chamber that excite and ionize a process gas so as to generate a plasma in the plasma chamber.

25 (Original): The plasma chamber of claim 24, wherein the top conductive section is grounded.

26 Canceled.

27 (Amended): The plasma chamber of claim 24, wherein the vertically-extending coil ~~vertical dielectric section is configured to couple to, via a thermally~~

~~conductive elastomer,~~ comprises a parasitic antenna that is not coupled to any radio frequency (RF) source.

28 (Original): The plasma chamber of claim 27, wherein the parasitic antenna includes a plurality of turns with one end grounded.

29 (Original): The plasma chamber of claim 28, further comprising means for adjusting a number of turns of the parasitic antenna providing a parasitic effect.

30 (Amended): The plasma chamber of claim ~~2427~~, wherein the radio frequency antenna is liquid cooled.

31 (Amended): The plasma chamber of claim 24, wherein the horizontally-extending coil ~~horizontal dielectric section is configured to support~~ comprises an active radio frequency antenna that is coupled to a radio frequency (RF) source.

32 (Original): The plasma chamber of claim 24, further comprising a process gas inlet and a strike gas inlet.